1,041,070

PATENT SPECIFICATION

DRAWINGS ATTACHED

1,041,070

Date of Application and filing Complete Specification Dec. 24, 1963.

No. 50853/63.

Application made in Germany (No. J23301 XII/47b) on March 7, 1963.

Complete Specification Published Sept. 1, 1966.

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Index at acceptance:—E2 F(1G, 1Y, 3CX, 3DX, 3J)

Int. Cl.:—E 05 d 5/10

COMPLETE SPECIFICATION

Improved Articulated Joint

We, INDUSTRIE-WERKE KARLSRUHE AKTIENGESELLSCHAFT, a German Company, of 71 Gartenstrasse, Karlsruhe, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed to be particularly described in and by the following statement:—

The present invention relates to articulated joints for tensionally stressed members, such as may for example be used in articulated pipe line joints with a corrugated tube section welded between two collars, flanges or the like, which latter are connected by articulated tie rods.

Such pipe line connections have been proposed with two parallel part-cylindrical axially divided joint pins located in the rotary joint, the rolling surfaces of which roll one upon the other; these joints naturally have some play in the bearing surfaces surrounded by the tie rods. They can therefore only absorb longitudinal forces produced by the internal pressure of the pipe line but not the twisting and/or transverse forces which may also appear. In the latter case the pins slide laterally on the rolling surfaces until the play in the joint is taken up. As a result of the sliding action premature wear occurs and there is no longer satisfactory operation of the part-cylindrical pin sections.

In order to avoid these disadvantages and particularly also at high loadings, for example 300 to 1000 metric tons, and to restrict the constructional size, while providing a construction which functions reliably, the invention comprises an articulated joint for tensionally stressed members in which aligned bores in said members are traversed by two parallel part-circular pins connected respectively to the two members, said pins having convex mutually engaging faces which are adapted to roll one on the other without clearance and in which one pin is supported within one of said bores by means of opposed thrust members each of which bears at one end against said bore and at the other end against a surface of said one pin, and the lines joining the engagement points of the two thrust members to the axis of the joint being disposed at an obtuse angle one to the other. In such case the arrangement is so constructed that one pin embodies recesses for receiving the two thrust members or the like against one surface of which the thrust members or the like bear. The thrust members are provided at their bearing ends with rounded parts which have a smaller radius than the counter bearing surfaces in the tension member and in the pin to provide the required rocking or rolling movement. Between the pin receiving the thrust members or the like and the associated tension member, there is a small spacing, i.e. a certain play, which in this case serves to allow the thrust member or the like to execute a pure rolling movement. Experiments have been made with needle and roller bearings but these result in a large diameter of the joint for high loadings and consequently cannot be utilised within limited constructional sizes.

By this construction the result is obtained that even with high loading and on the appearance of twisting and/or transverse forces, a pure rolling movement on the rolling surfaces of the pins portions located on the bores of the joint occurs.

The invention is shown and described hereinafter in three constructional forms on the basis of four accompanying drawing figures wherein:

Fig. 1 shows an articulated joint with parallel joint pins rolling one upon the other, and two inclined opposed thrust members, as seen in the direction of the arrow I in Fig. 2.

Fig. 2 is a section on the line II—II in Fig. 1,

Figs. 3 and 4 are composite views, the

left-hand section (Fig. 3) showing a rotary joint according to Fig. 1 with two thrust members disposed in one half section of the top pin, and the right-hand section (Fig. 4) showing a rotary joint according to Fig. 1 with a roller instead of a rolling thrust member.

A part-cylindrical pin 1 (Fig. 1) is forced by a tie rod 3 against a second part-cylindrical pin 2. Conversely the part-cylindrical pin 2 is forced against the semi-cylindrical pin 1 by a tie rod 4. The part cylindrical pins 1 and 2 have convex rolling surfaces 5 and 6 on the opposed faces bearing one upon the other, and are accommodated in aligned bores in the ends of the tie rods 3 and 4.

In order to absorb twisting and/or transverse forces and thus to avoid shifting of the one pin 2 away from the other pin 1, a roll-action thrust member 9 is fitted in each of two recesses 7 and 8 of the pin 2. The thrust members lie at one end against the surfaces 10 and 11 of the pin 2 and at the other end against the inner walls of the tie rod 3. The axes of the thrust members are directed towards the joint axis and make an obtuse angle α one to the other, for example of 150°. The bearing surfaces of the thrust members are rounded at their operative ends in order that they can execute a rolling movement. The pin 2 has a clearance S relatively to the tie rod 3 and the pin 1 likewise has clearance S′ relatively to the tie rod 4, which remains even under lateral pressure conditions.

Also instead of using one thrust member on one side of the pin, two thrust members may be provided, as shown in Fig. 3. Finally the rolling thrust members may be in the form of rollers (Fig. 4).

WHAT WE CLAIM IS:—

1. An articulated joint for tensionally stressed members in which aligned bores in said members are traversed by two parallel part-circular pins connected respectively to the two members, said pins having convex mutually engaging faces which are adapted to roll one on the other without clearance and in which one pin is supported within one of said bores by means of opposed thrust members each of which bears at one end against said bore and at the other end against a surface of said one pin, and the lines joining the engagement points of the two thrust members to the axis of the joint being disposed at an obtuse angle one to the other.

2. An articulated joint according to claim 1, characterised in that the pin receiving the thrust member embodies recesses against which one surface of each thrust member or the like rest.

3. An articulated joint according to claims 1 and 2, characterised in that a small clearance is present between the pin receiving the thrust member and the bore in the associated tensionally stressed member and also between the other pin and the bore of the other tensionally stressed member.

4. Rotary joint device with rolling engagement, substantially as herein described and illustrated.

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17 Wilson Street, London, E.C.2.
Chartered Patent Agents.

Leamington Spa: Printed for Her Majesty's Stationery Office by the Courier Press.—1966.
Published at The Patent Office, 25, Southampton Buildings, London, W.C.2, from which copies may be obtained.

1041070 COMPLETE SPECIFICATION
1 SHEET *This drawing is a reproduction of the Original on a reduced scale*

Fig 1

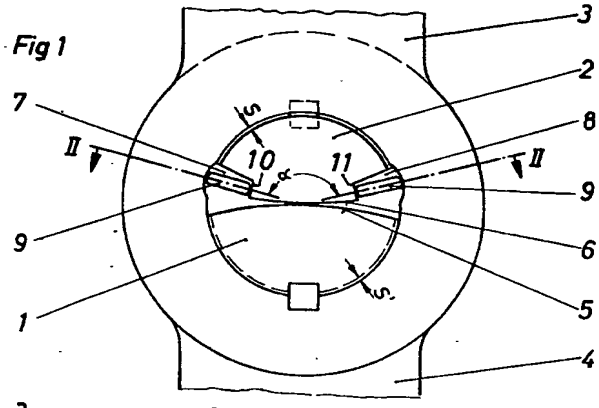

Fig 2

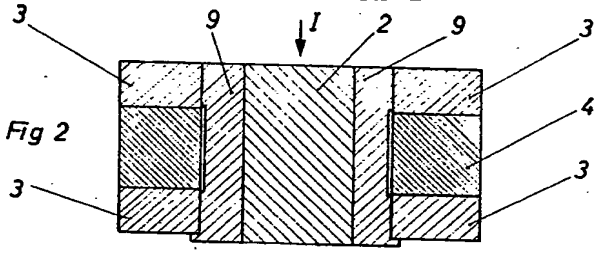

Fig 3

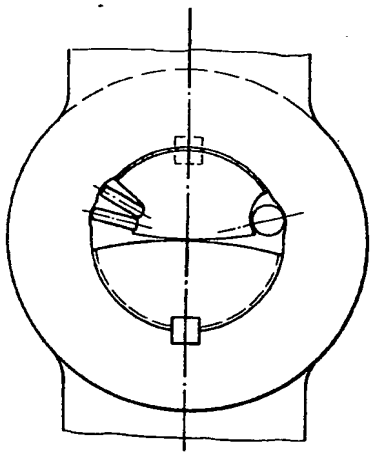

Fig. 4